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The purpose of this study was to determine if sex differences were observable in 1-year-olds in response to their mother and in choice and style of play with toys. Thirty-two boys and thirty-two girls were put in separate rooms with several toys, several nontoys (door knobs, taped sockets, etc.) and their mothers. The infant's mother was to observe the child in play and respond as she desired. Observation was conducted from another room. Earlier in the study, the mother's touching behavior of the 6-month-old infant was observed. The results showed that at 1 year, boys were more independent of their mothers than were the girls, who touched their mothers and vocalized more frequently. Boys demonstrated more exploratory play and banging of toys than the sedate and quiet playing girls. It was shown that the boys' dependence was directly proportionate to the amount of touching at 6 month's old given by the mother. For girls, a curvilinear scale resulted. Girls who were touched moderately were more independent than those touched greatly or very little. It was concluded that the child's independence was influenced by the mother's behavior toward the child at an earlier age. From the results of toy play behavior, it was concluded that parents reinforced sex role behavior in the 1-year-old and later the child internalized such roles. (JS)

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Play Behavior in the Year-Old Infant: Early Sex Differences

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Introduction

Interest in play behavior as a subject for theoretical and empirical consideration has had a cyclical history. Theoretical work on play dates back as far as Spencer, Wundt and G. Stanley Hall and far outweighs the empirical work in quantity. The most active period in empirical work appears to have been the 1920's and '30's, the period during which the nursery school movement was growing rapidly. Subsequently, perhaps as a consequence of our involvement in World War II, play research seems to come to an abrupt halt with only a few special areas, doll play, for example, remaining active.

Theoretical approaches and definitions of play have been as diverse as that of Spencer's "surplus energy theory," (1873); the pre-exercise theory of Groos (1898, 1908); "growth" theories such as those of Lange (1901) and Appleton (1910); and more recently, those of Freud (1938) and Piaget (1951). Although all of these theories have testable consequences, there has been little empirical work derived from or designed to test these theories.

It is clear that play behavior must be distinguished in some way from behavior not considered play. We shall call behavior "play" when the subject shows free emission of responses such that choice of response and rate of emission are determined solely by the organism. Moreover, S's motive is self-determined without any clear, visible or standard outcome. Using this definition, for very young children, play is their normal activity, that is, except when being studied by psychologists or being controlled by their parents.

The ecological study of organisms, human or animal, can contribute to our understanding of behavior by supplying the investigator with the classes of naturally occurring behaviors, the conditions under which various responses normally occur, and the

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preference level of these behaviors. The knowledge of this repertoire of behavior is most important before any experimental results can be understood, for interpretation of a result, obtained by manipulating one response or an isolated portion of a repertoire can produce vastly misleading conclusions (Lewis, 1967). Kavanau (1962) using an approximation of a pure ecological study has demonstrated, at least with deer mice, that an activity that is normally rewarding when chosen by the animal in a "natural" environment can be punishing when that activity is enforced by experimental manipulation.

The past few years have seen a great upsurge of interest in very young children with accompanying experimental inquiry. However, there has been little observation of young children's behavior in a free play situation.

A purely ecological study of the very young child would be difficult because observation in the home produces problems not easily solved. Observation must overcome the interference from other children and adults in the family and the elicitation of maternal behavior not consistent with usually occurring response patterns. Finally, the observation itself may elicit atypical behavior from the child.

A compromise between the experimental manipulation and pure ecological observation is to bring the child to a laboratory setting where he can be observed and where his behavior is relatively free from control or manipulation. Moreover, allowing the mother to be present creates a more natural surrounding. This type of observational situation can be standardized with the objects and their position in the environment held constant.

Whereas observation in the home precludes evaluation of individual differences, behavior in a standardized free play situation can be assumed to reflect individual differences. It might be noted that this type of compromise in observation has been used widely in animal research; e.g., Barnett (1967) in studying free-roaming behavior of wild and laboratory raised rats and Kavanau's (1962) study with deer mice to mention a few.

Method

In the present study, 32 girls and 32 boys were seen at approximately a year of age. Each infant accompanied by his mother was placed in an observation room. The mother was instructed to

watch the child's play and respond in any way she desired. Most of the mothers simply watched the child's play and responded only when the child asked for something. She was also told that we would be watching from the next room. The play room contained nine simple toys, e.g., set of blocks, pail, lawnmower, stuffed dog, cat, set of quoits, wooden mallet, a pegboard and a wooden bug. Also included as toys were any permanent objects in the room such as the door knob, latch on the wall, tape on the electrical outlets, etc. The mother's chair was located in one corner of the room. The mother held the child on her lap, the door to the play room was closed and observation began. At the start of the 15 minutes of play, the mother was instructed to place the child down on the floor. Two observers recorded the infant's behavior: one dictated a continuous behavioral account into a tape recorder, the second operated an event recorder which recorded the location of the child in the room and in relation to his mother. The transcribed tape was then divided into 15-[redacted] segments from which we scored a variety of behaviors. No behavioral inferences were recorded during the initial dictation nor were any inferences scored. From the transcribed tape recording we obtained information about the child's behavior with the toys, such as the amount of time spent with each toy, the number of toys played with, number of toy changes, and latency to contact with each toy. To facilitate recording the activity and location of the child, the floor of the room was divided into 12 squares. For each square, the observer depressed a key on the event recorder for the duration of the time the child was in that square. A 13th key was depressed each time the child touched the mother. From this record it was possible to obtain such measures as the amount of time spent in each square, the number of squares traversed, initial latency in leaving the mother and the amount of time close to or touching the mother.

The data analysis presented in this report will provide information only on sex differences (1) in response to the mother, and (2) in choice and style of play with toys. Other data from this situation are presented elsewhere (Lewis, 1967).

Results

Response to Mother

There were striking differences between boys and girls in their behavior toward their mothers. Upon being removed from their mother's laps, girls were reluctant to leave their mothers, and

once they had left, made many returns, both visual and physical, i.e., looking at and touching the mother. They tended to play in the squares close to their mothers and to spend much time in physical contact with them. Finally, girls vocalized more than boys. In contrast,boys were more independent. They were more likely to leave their mothers quickly once placed from their laps and to spend more time exploring the room in silence. Boys traversed more squares than girls and spent more time in squares away from their mothers. Thus, girls interacted more with their mothers than boys, while boys spent more time exploring the room and its contents. These differences were significant: touching mother, $p<.02$; looking at mother; $p<.09$; vocalizing, $p<.02$; leaving mother, $p<.01$.

At the end of the 15 minutes of free play, a barrier was placed in such a way as to divide the room in half. The child was placed by the mother on one side and the mother and toys were on the other. Thus, the children's response to stress was observed. Sex differences were again prominent with girls crying and motioning for help consistently more than boys, and boys making more active attempts to get around the barrier than girls. The play and stress situation indicate clear differences between girls and boys in their response to their mothers.

One possible determinant of the child's behavior toward the mother in the playroom is the mother's behavior toward the child at an earlier age. For the infants in our sample, we had a measure of the amount of time the mother spent touching the child at six months, based on ratings by an observer of the amount of time the mother touched, held and physically comforted the infant. On this basis, we divided the mothers into high, medium and low mother-touch-infant groups with the extreme groups consisting of the upper and lower 25 per cent of the sample. For the boys at 13 months, the mean number of seconds of physical contact with the mother indicated a linear relationship (14, 37 & 47 secs. for the low, medium and high mother-touch groups respectively; high vs. low, $p<.08$). Thus, the more physical contact the mother made with a boy at six months, the more he touched the mother at 13 months. For the girls, the relationship appeared to be curvilinear [the mean number of seconds touching (or close to) for the low, medium and high mother-touch groups were 101 (589), 55 (397), and 88 (475) respectively; Kruskal-Wallis, $p<.10$ ($p<.03$)]. Thus, a girl whose mother initiated very much or very little contact with her at six months was more likely to seek a great deal of physical contact with the mother in the playroom than one whose mother was in the medium-touch infant group.

Observation of the mother's behavior at six months revealed that five of the seven girls whose mothers showed little physical contact were considered by the staff to be severely rejecting mothers. The data suggest that the child of a rejecting mother continues to seek contact despite the mother's behavior. This result is consistent with Harlow's work with rejected monkeys (Seay, Alexander & Harlow, 1964) and Provence's work with institutionalized children (1962, 1965) and suggests that the child's need for contact with its mother is a most powerful motive.

Toy Preference

A second area of interest was toy preference. For each toy, four measures of play were available: (1) the number of times S played with the toy, (2) the total amount of time, (3) longest single time, (4) latency to play with that particular toy. When the nine toys were ranked in order of the total amount of time they were played with, girls and boys showed similar patterns of preference. The toys which were used most were the lawnmower, blocks and quoits, and the toys which were used least were the stuffed dog and cat. On a post hoc basis, it seems as if the toys which received the most attention were those that offered the most varied possibilities for manipulation. Although there were no sex differences in overall toy preference, there were significant sex differences in the amount of time spent with individual toys and in the way toys were used. Girls played with blocks, pegboard and with the dog and cat (the only toys with faces) more than boys. Observation of the girls' play indicated that fine muscle coordination and quiet activities were more characteristic of the girls' play. Boys spent more time playing with the non-toys (floor tape, koor knob, outlets, etc.) which provides further support for boys' differential exploration of the room.

While girls tended to sit and play with combinations of toys ($p<.01$), boys tended to be more active and showed significantly more banging of the toys than girls ($p<.08$). Thus, the data on play preference indicate that girls tended to play with groups of toys, possibly a more complex kind of play, while boys tended to bang and play more actively. Further, girls tended to stay in one place while boys tended to explore the room and play with objects originally not classified as toys.

Discussion

The data indicate that there are important and significant sex differences in young children's response to their mothers and in

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their toy play behavior. Girls were more dependent, showed less exploratory behavior and their play behavior reflected a more quiet play style such as stacking blocks. Boys were independent, showed more exploratory behavior, played with toys requiring gross motor activity, were more vigorous, and tended to run and bang as a style of play. It is clear that these behaviors approximate those usually found between the sexes at later ages. The data demonstrate that these behaviors are already present in the first year of life and have been influenced by the mother's response to the infant in the first six months.[2] It appears as if the parents are the active promulgators of sex role behavior through reinforcement of sex appropriate responses within the first year. In the opening year or two the parents reinforce those behaviors they consider sex role appropriate and the child learns these sex role behaviors independent of any internal motive; i.e., the same as he learns any appropriate response rewarded by his parents. The young child has little idea as to the rules governing this reinforcement. We suggest, however, that as he gets older, above the age of three, the rules for this class of reinforced behavior become clearer, and the child develops internal guides to follow these earlier reinforced rules. In the past these internalized rules, motivating without apparent reinforcement, have been called modeling. Thus, modeling behavior can be considered an extension or internalization of the earlier reinforced sex role behavior. It is clear that the young child, before seeking to model his behavior, is already knowledgable in some appropriate sex role behavior. While early reinforcement does account for some of the later sex differences, genetic factors must not be ignored as effective determinants of early sex differences. The animal work of Young and his colleagues (1964), for example, has shown genetic and hormonal influences on sex differences.

The fact that parents are concerned with early sex role behavior is reflected in an interesting clinical observation. On some occasions, staff members have incorrectly identified the sex of an infant. Mothers are often clearly irritated by this error. Since the sex of a fully clothed infant is hard to determine, the mistake seems understandable and the mother's displeasure uncalled for. If, however, she views the infant and behaves toward him in terms of sex appropriate behaviors, our mistake is more serious. That is, the magnitude of her displeasure reveals to us the magnitude of her cognitive commitment to this infant as a child of given sex.

Regardless of the interpretation of the observed sex differences, the free play procedure provides a standardized situation in which young children can be observed without interference from experimental manipulation. While behavior under these conditions may be somewhat different from the young child's typical daily behavior, our data indicate that behavior in the play situation is related to other variables, can be predicted from earlier events and is indicative of later sex role behavior.

Footnotes

1. This research was supported in part by Grants HD-00868, FR-00222 and FR-05537 from the National Institute of Mental Health, United States Public Health Service.

2. Mothers of girls were rated as touching their infants more than mothers of boys. On a scale where 1 indicated most touching and 7 least, there were twice as many girls as boys whose mothers were rated 1-3 and twice as many boys as girls whose mothers were rated 5-7. Mothers vocalized to girls significantly more than to boys ($p<.001$) and significantly more girls than boys were breast rather than bottle fed ($p<.02$).

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